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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/654,203	09/03/2003	James A. Rakowski	RL-2000	5809

7590 09/10/2008

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EXAMINER	
ROE, JESSEE RANDALL	
ART UNIT	PAPER NUMBER
1793	
MAIL DATE	DELIVERY MODE
09/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/654,203	RAKOWSKI, JAMES A.	
	Examiner	Art Unit	
	Jessee Roe	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,9-11,13,14,16,18 and 20-28* is/are pending in the application.

4a) Of the above claim(s) *6,14,23,24,27 and 28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 9-11, 13, 16, 18, 20-22 and 25-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 1-6, 9-11, 13-14, 16, 18 and 20-28 are pending wherein claims 1, 10-11, 13, 16, 18, 20-22 and 25-26 are amended; claims 7-8, 12, 15, 17, 19 and 29-98 are canceled; and claims 6, 14, 23-24 and 27-28 are withdrawn from consideration.

Status of Previous Objections

The previous objection to claims 1 and 18 for minor informalities is withdrawn in view of the Applicant's amendments to the claims.

Status of Previous Rejections

The previous rejection of claims 1-5, 9-11, 13, 16, 18, 20-22 and 25-26 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement is withdrawn in view of the Applicant's arguments. The previous rejection of claims 1-5 and 9-10 under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,641,780) is withdrawn in view of the Applicant's arguments. The previous rejection of claims 7, 11, 13, 16, 18, 21 and 25-26 under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,641,780) in view of Gamble (US 2,692,853) and/or Faust (US 2,338,321) is withdrawn in view of the Applicant's arguments. The previous rejection of claims 1-5 and 9-10 under 35 U.S.C. 103(a) as being unpatentable over Takehiro (JP 10-280103) is withdrawn in view of the Applicant's arguments and amendments to the claims. The previous rejection of claims 7, 11-13, 16, 18, 20-22 and 25-26 under 35 U.S.C. 103(a)

as being unpatentable over Takehiro (JP 10-280103) in view of Gamble (US 2,692,853) and/or Faust (US 2,338,321) is withdrawn in view of the Applicant's arguments and amendments to the claims. The previous rejection of claims 1-5 and 9-10 under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,228,932) is withdrawn in view of the Applicant's arguments and amendments to the claims. The previous rejection of claims 7, 11-13, 16, 18 and 25-26 under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,228,932) in view of Gamble (US 2,692,853) and/or Faust (US 2,338,321) is withdrawn in view of the Applicant's arguments and amendments to the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 9-11, 13, 16, 18, 20-22 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Ono (JP 10-280103).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Ono (JP '103) discloses, in the same field of endeavor, adding 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals to a ferritic stainless steel alloy, having the same amount of chromium as Szummer et al., to improve oxidation (corrosion) resistance [0017] and [0019].

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals, as disclosed by Ono (JP '103), to the ferritic stainless steel, as disclosed by Szummer et al., in order to improve oxidation (corrosion) resistance, as disclosed by Ono (JP '103).

With respect to the recitations "so that, when subjected to an oxidizing atmosphere at high temperature, the electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differering from Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3" as recited in lines 9-13 of claim 1, "wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3" as recited in claim 2, and "wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 5, neither Szummer et al. nor Ono (JP

'103) specify the hematite structure that would be formed. However, Szummer et al. in view of Ono (JP '103) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Ono (JP '103) would have the hematite structure and the hematite lattice parameters as claimed in the instant invention. MPEP 2112.01 I.

With respect to the recitations "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C." of claim 3, "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 4 and "wherein the modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and is therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "so that the electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore

considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "wherein the at least one electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 16, Ono (JP '103) discloses adding 0 to 1 weight percent aluminum [0019].

In regards to claim 18, Ono (JP '103) discloses yttrium and hafnium [0017].

In regards to claim 20, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium (page 356, column 2). Ono (JP '103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals ([0013], [0017] and [0019]).

In regards to claim 21, Ono (JP '103) discloses 0 to 2 weight percent nickel, 0 to 1 weight percent manganese, 0 to 3 weight percent silicon, 0 to 0.2 weight percent carbon, 0 to 1 weight percent titanium, and does not specify the necessity of adding nitrogen which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7

silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (claim 4 of Ono (JP '103)).

In regards to claim 22, Ono (JP '103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals, which includes cerium and lanthanum, which overlaps "in weight percent, about 22 chromium, about 0.6 aluminum, cerium and lanthanum, wherein the sum of the weights of cerium and lanthanum is up to about 0.10" ([0013], [0017] and[0019]).

In regards to claim 25, Szummer et al. discloses placing the ferritic stainless steel in a 1N H_2SO_4 (sulfuric acid) solution and passing a 0.1 A/cm^2 current to perform thinning (material removal) (page 356, column 2).

With respect to the recitation "thereby reducing surface roughness of the surface" as recited in line 6 of claim 25, the Examiner notes that Szummer et al. in view of Ono (JP '103) discloses the same or a substantially similar composition and the same processing. Therefore a surface roughness reduction would be expected. MPEP 2112.01 I.

With respect to the recitation "wherein electropolishing the at least one surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell" of claim 26, the Examiner notes Szummer et al. in view of Ono (JP '103) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Claims 1-5, 9-11, 13, 18, 21 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Linden et al. (WO 99/10554).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Linden et al. (WO '554) discloses ferritic stainless steels comprising 15 to 25 weight percent chromium wherein 3 to 7 weight percent aluminum would be added to form a protective oxide layer and 0 to 0.5 weight percent of cerium, lanthanum, yttrium, and hafnium would be added to improve adhesion of the oxide layer (abstract, page 3, lines 15-32, page 4, lines 17-32 and page 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add 3 to 7 weight percent aluminum and 0 to 0.5 weight percent of cerium, lanthanum, yttrium, and hafnium, as disclosed by Linden et al. (WO '554), to the ferritic stainless steel containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium, as disclosed by Szummer et al., in order to form a protective oxide layer and improve adhesion of the oxide layer, as disclosed by Linden

et al. (WO ‘554) (abstract, page 4, lines 17-32 and page 7).

With respect to the recitations “so that, when subjected to an oxidizing atmosphere at high temperature, the electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differering from Fe_2O_3, alpha Cr_2O_3 , and alpha Al_2O_3” as recited in lines 9-13 of claim 1, “wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3 , and alpha Al_2O_3” as recited in claim 2, and “wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å” of claim 5, neither Szummer et al. nor Linden et al. (WO ‘554) specify the hematite structure that would be formed. However, Szummer et al. in view of Linden et al. (WO ‘554) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Linden et al. (WO ‘554) would have the hematite structure and the hematite lattice parameters as claimed in the instant invention. MPEP 2112.01 I.

With respect to the recitations "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C.” of claim 3, "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C.” of claim 4 and “wherein the modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale

is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and is therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "so that the electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "wherein the at least one electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 18, Linden et al. (WO '554) 0 to 0.5 weight percent of cerium,

lanthanum, yttrium, and hafnium (abstract and page 7).

In regards to claim 21, Linden et al. (WO ‘554) discloses less than 2 weight percent nickel, less than 2 weight percent manganese, less than 2 weight percent silicon, less than 0.05 weight percent carbon, 0.005 to 0.03 weight percent titanium, and less than 0.05 weight percent nitrogen which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7 silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (page 3, lines 15-32).

In regards to claim 25, Szummer et al. discloses placing the ferritic stainless steel in a 1N H_2SO_4 (sulfuric acid) solution and passing a 0.1 A/cm^2 current to perform thinning (material removal) (page 356, column 2).

With respect to the recitation “thereby reducing surface roughness of the surface” as recited in line 6 of claim 25, the Examiner notes that Szummer et al. in view of Linden et al. (WO ‘554) discloses the same or a substantially similar composition and the same processing. Therefore a surface roughness reduction would be expected. MPEP 2112.01 I.

With respect to the recitation “wherein electropolishing the at least one surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell” of claim 26, the Examiner notes Szummer et al. in view of Linden et al. (WO ‘554)discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Claims 1-5, 9-11, 13, 16, 18, 21 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Uematsu et al. (JP 06-172933).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Uematsu et al. (JP '933) discloses adding 1 to 4.5 weight percent aluminum, to maintain high temperature oxidation resistance, and 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium, to improve adhesion of the oxide film, for a ferritic stainless steel having 15 to 25 weight percent chromium ([0012-0013] and [0015-0016]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 1 to 4.5 weight percent aluminum and 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium, as disclosed by Uematsu et al. (JP '933), to the ferritic stainless steels, as disclosed by Szummer et al., in order to maintain high temperature oxidation resistance and improve adhesion of the oxide film, as disclosed by Uematsu et al. (JP '933) (abstract, [0012-

0013] and [0015-0016]).

With respect to the recitations “so that, when subjected to an oxidizing atmosphere at high temperature, the electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differering from Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3” as recited in lines 9-13 of claim 1, “wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3” as recited in claim 2, and “wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å” of claim 5, neither Szummer et al. nor Uematsu et al. (JP ‘933) specify the hematite structure that would be formed. However, Szummer et al. in view of Uematsu et al. (JP ‘933) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Uematsu et al. (JP ‘933) would have the hematite structure and the hematite lattice parameters as claimed in the instant invention. MPEP 2112.01 I.

With respect to the recitations "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C.” of claim 3, "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C.” of claim 4 and “wherein the modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least

100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and is therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "so that the electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "wherein the at least one electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 16, Uematsu et al. (JP '933) discloses adding 1 to 4.5 weight

percent aluminum [0013].

In regards to claim 18, Uematsu et al. (JP ‘933) discloses 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium [0015-0016].

In regards to claim 21, Uematsu et al. (JP ‘933) discloses 0 to 0.03 weight percent nitrogen, 0 to 0.3 weight percent manganese, 0 to 0.2 weight percent silicon, 0 to 0.03 weight percent carbon, 0.01 to 0.5 weight percent titanium, and does not specify the necessity of adding nickel which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7 silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (abstract).

In regards to claim 25, Szummer et al. discloses placing the ferritic stainless steel in a 1N H_2SO_4 (sulfuric acid) solution and passing a 0.1 A/cm^2 current to perform thinning (material removal) (page 356, column 2).

With respect to the recitation “thereby reducing surface roughness of the surface” as recited in line 6 of claim 25, the Examiner notes that Szummer et al. in view of Uematsu et al. (JP ‘933) discloses the same or a substantially similar composition and the same processing. Therefore a surface roughness reduction would be expected. MPEP 2112.01 I.

With respect to the recitation “wherein electropolishing the at least one surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell” of claim 26, the Examiner notes Szummer et al. in view of Uematsu et al. (JP ‘933) discloses the same or a substantially similar composition and the same

processing. Therefore, this property would be expected. MPEP 2112.01 I.

Claims 1-5, 9-11, 13, 16, 18, 20-22 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Matsui et al. (JP 09-209092).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Matsui et al. (JP '092) discloses adding 0.01 to 2 weight percent aluminum, in order to improve high temperature oxidation (corrosion) resistance, and 0.001 to 0.05 of rare earth metals such as yttrium, in order to improve the oxide film, to stainless steel having 20 to 80 volume percent ferritic phase (ferritic stainless steel) and 15 to 27 weight percent chromium (abstract and [0018]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 0.01 to 2 weight percent aluminum and 0.001 to 0.05 weight percent rare earth metals such as yttrium, as disclosed by Matsui et al. (JP '092), to the ferritic stainless steels, as disclosed by Szummer et al., in order

to maintain high temperature oxidation resistance and improve adhesion of the oxide film, as disclosed by Matsui et al. (JP '092) (abstract and [0018]).

With respect to the recitations "so that, when subjected to an oxidizing atmosphere at high temperature, the electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differering from Fe_2O_3, alpha Cr_2O_3 , and alpha Al_2O_3" as recited in lines 9-13 of claim 1, "wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3 , and alpha Al_2O_3" as recited in claim 2, and "wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 5, neither Szummer et al. nor Matsui et al. (JP '092) specify the hematite structure that would be formed. However, Szummer et al. in view of Matsui et al. (JP '092) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Matsui et al. (JP '092) would have the hematite structure and the hematite lattice parameters as claimed in the instant invention. MPEP 2112.01 I.

With respect to the recitations "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C." of claim 3, "wherein the at least one modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 4 and "wherein the modified surface develops the oxide scale when heated in an oxidizing atmosphere for at least

100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and is therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "so that the electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the recitation "wherein the at least one electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 16, Matsui et al. (JP '092) discloses adding 0.01 to 2 weight percent aluminum [0018].

In regards to claim 18, Matsui et al. (JP '092) discloses adding 0.001 to 0.05 of rare earth metals such as yttrium (abstract and [0018]).

In regards to claim 20, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium (page 356, column 2). Matsui et al. (JP '092) discloses 15 to 27 weight percent chromium, 0.01 to 2 weight percent aluminum and 0.001 to 0.05 of rare earth metals such as yttrium, which overlaps "in weight percent, 18 up to 22 chromium, 0.4 to 0.8 aluminum and 0.02 to 0.2 REM" as instantly claimed (abstract and [0018]).

In regards to claim 21, Matsui et al. (JP '092) discloses 0.01 to 0.15 weight percent nitrogen, 0.1 to 2 weight percent manganese, 0.1 to 2 weight percent silicon, 0.06 to 0.2 weight percent carbon, 0.01 to 2 weight percent titanium, and 1 to 8 weight percent nickel which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7 silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (abstract).

In regards to claim 22, Matsui et al. (JP '092) discloses 15 to 27 weight percent chromium, 0.01 to 2 weight percent aluminum and 0.001 to 0.05 weight percent rare earth metals, which includes cerium and lanthanum, which overlaps "in weight percent, about 22 chromium, about 0.6 aluminum, cerium and lanthanum, wherein the sum of the weights of cerium and lanthanum is up to about 0.10" ([0013], [0017] and[0019]).

In regards to claim 25, Szummer et al. discloses placing the ferritic stainless steel in a 1N H_2SO_4 (sulfuric acid) solution and passing a 0.1 A/cm^2 current to perform thinning (material removal) (page 356, column 2).

With respect to the recitation “thereby reducing surface roughness of the surface” as recited in line 6 of claim 25, the Examiner notes that Szummer et al. in view of Matsui et al. (JP ‘092) discloses the same or a substantially similar composition and the same processing. Therefore a surface roughness reduction would be expected. MPEP 2112.01 I.

With respect to the recitation “wherein electropolishing the at least one surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell” of claim 26, the Examiner notes Szummer et al. in view of Matsui et al. (JP ‘092) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Response to Arguments

Applicant's arguments with respect to claims 1-5, 9-11, 13, 16, 18, 20-22 and 25-26 have been considered but are moot in view of the new ground(s) of rejection.

Response to Declaration filed under 37 CFR § 1.132

In response to the Declaration under 37 CFR §1.132 filed 24 June 2008 where the Applicant declares that metallurgists believed that high temperature oxidation resistance of ferritic stainless steel would not be improved by electropolishing the

surface thereof prior to 3 September 2003 (i.e. the filing date of the Application) has been deemed unpersuasive because the Declaration fails to set forth evidence to substantiate the conclusory statements set forth therein.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John P. Sheehan/
Primary Examiner, Art Unit 1793

JR